

**ACTION REPORT
STATE WATER CONTROL BOARD MEETING
MONDAY, NOVEMBER 21, 2005
HOUSE ROOM D, GENERAL ASSEMBLY BUILDING
9TH & BROAD STREETS
RICHMOND, VIRGINIA**

Convene - 9:07 A.M.

Board Members Present (note one vacancy):

Carol C. Wampler, Chair
E. Bryson Powell
W. Shelton Miles, III

Komal K. Jain, Vice-Chair
Thomas D. C. Walker

Department of Environmental Quality:

Robert G. Burnley, Director, DEQ
Cindy M. Berndt

Office of the Attorney General:

Jack Edward Kotvas, Assistant Attorney General

I. Formal Hearing Decision – Dinwiddie County Water Authority Permit Upheld as Issued

II. Final Regulations

Policy for Nutrient Enriched Waters – Chesapeake Bay -
And Water Quality Management Planning Regulations
Water Quality Standards – Chlorophyll

Planning Reg Amendments
Adopted
Standards Amendments
Adopted

ADJOURNED: 10:45 a.m.

**POINT SOURCE NUTRIENT CONTROL REGULATIONS FOR DISCHARGERS IN THE
CHESAPEAKE BAY WATERSHED**

Executive Summary

Staff intends to ask the Board to adopt amendments to two sections of the Water Quality Management Planning Regulation (“WQMP”, 9 VAC 25-720) that were deferred at the September 21, 2005 meeting:

- (1) 9 VAC 25-720-60. James River Basin, C. Nitrogen and Phosphorus Waste Load Allocations to Restore the Chesapeake Bay and its Tidal Tributaries, and
- (2) 9 VAC 25-720-120. York River Basin, C. Nitrogen and Phosphorus Waste Load Allocations to Restore the Chesapeake Bay and its Tidal Tributaries.

The proposed amendments, to the York and James Basins' total nitrogen and total phosphorus waste load allocations, will complete the rulemaking process for point source nutrient control regulations for significant dischargers in the Chesapeake Bay watershed.

Background

These actions follow the Board's decision at their June 28, 2005 meeting to adopt the amended WQMP Regulation and suspend the effective date to allow for another 30-day public comment period. The Board then took final action at the September 21, 2005 meeting to adopt the proposed amendments to other sections of the WQMP Regulation, including nutrient waste load allocations for significant dischargers in the Shenandoah-Potomac, Rappahannock, and Eastern Shore Basins. Requests received during the re-opened comment period for increased waste load allocations from dischargers in the York and James basins were deferred at that time, to be addressed when final recommendations for the special water quality standards proposed for those waters (site-specific dissolved oxygen in the Pamunkey and Mattaponi; numeric chlorophyll criteria in the James) were presented to the Board for consideration at the November 21, 2005 meeting.

The other key reason for deferring staff recommendations on the James and York nutrient waste load allocations in September was to allow time for the EPA-Chesapeake Bay Program Office to run additional water quality modeling scenarios that had been negotiated with the Virginia Association of Municipal Wastewater Agencies ("VAMWA"). These scenario runs simulated varying nutrient reduction levels at the wastewater treatment plants in the York and James basins, with an assessment of the resulting water quality conditions in terms of compliance with dissolved oxygen standards in the York, and proposed numeric chlorophyll criteria in the James. These model results were released for public review on October 18, 2005, with comments accepted until November 1, 2005. Briefings were also held for key stakeholder groups including citizen conservation organizations, VAMWA, Virginia Manufacturing Association, as well as EPA Bay Program and Region 3 staff.

During the re-opened review period (July-August) for the WQMP Regulation, comments were received from several dischargers in the York and James basins requesting increased nutrient waste load allocations. These are addressed in the "Public Comment Issues" section which follows later in this memorandum.

During the review period (October-November) for the additional James and York Water Quality Modeling Results, 12 respondents submitted comments, including public wastewater treatment facility owners, citizen conservation groups, an individual citizen, a Virginia State agency, and a federal agency. Comments needing an agency response are also addressed in the "Public Comment Issues" section below.

Substance Of Amendments And Revisions

Water Quality Management Plan Regulation; 9 VAC 25-720: The revisions made to the June 28, 2005 amended regulation are as follows:

1. Section 720-60. James River Basin, C. Nitrogen and Phosphorus Waste Load Allocations to Restore the Chesapeake Bay and its Tidal Tributaries: final discharged waste load allocations for total nitrogen and total phosphorus are assigned to the significant dischargers listed.
2. Section 720-120. York River Basin, C. Nitrogen and Phosphorus Waste Load Allocations to Restore the Chesapeake Bay and its Tidal Tributaries: final discharged waste load allocations for total nitrogen and total phosphorus are assigned to the significant dischargers listed.

Public Comment Issues

A. Water Quality Management Planning Regulation (9 VAC 25-720-60-C., James River Basin, and 9 VAC 25-720-120-C., York River Basin)

1. **Comment:** Five dischargers in the York basin and ten dischargers in the James basin requested increased nutrient load allocations, the major reasons being a claim that they will have expanded treatment facilities in operation by 2010, or less stringent treatment levels can be required and still achieve the State's water quality restoration goals.

Response: *Establishing nutrient load allocations has been based, in part, on the design capacity of the wastewater treatment facility that is certified for operation by 2010. Several owners requested additional nutrient load allocations due to claims their facilities will be expanded by that date. After staff review of the information submitted by these owners, some were judged to have provided reasonable assurance that their treatment facility would be certified to operate at the expanded flow by 2010. In these cases, the higher allocation was included in the regulation, usually with a footnote in the river basin table that stated the allocation would revert to the amount based on their existing design flow if the expanded facilities were not on-line by 2010.*

For dischargers that did not receive a requested higher allocation, staff believes some assurance has been provided that an increase in allocation will be considered in the future should their facility be expanded and operational by 2010. At the September 21, 2005 meeting, the Board adopted a new section, 9 VAC 25-720-40.D., which recognizes that the Board may amend the regulation in the future to adjust individual nutrient load allocations for a number of reasons, including completion of a plant expansion as evidenced by issuance of a Certificate to Operate by December 31, 2010. The section also states that any adjustments to allocations must ensure water quality standards are maintained.

Based on staff review of requested waste load allocation (WLA) increases, figures in the Water Quality Management Planning Regulation either remain unchanged or have been revised as follows for facilities in the York and James Basins:

York

- Caroline County Regional STP - WLAs currently based on 0.5 MGD design flow; request increase based on 3.0 MGD. Caroline County claims the expanded plant will be in service by 2010, but no major milestones timeline (e.g., permit modification, preliminary engineering report [PER], plans and specifications, bidding, construction) was provided. Evidently a consultant has just begun work on a re-rating study, optimization of existing plant, and PER development. Design flow basis for WLAs remains unchanged, as project is still in very early planning stages with no reasonable assurance the expanded plant will be certified for operation by December 2010.
- Hanover Co.-Totopotomoy STP – WLAs currently based 5.0 MGD design; request increase based on 10.0 MGD. The plant's discharge permit has a 10.0 MGD flow tier, and the County provided details on investments in current plant (over 35%) for units capable of treating 10.0 MGD, a Capital Improvement Program schedule beginning in July 2008 for the remaining work to bring the full plant capacity to 10.0 MGD, and Comprehensive Plan estimates of average daily flows reaching 10.0 MGD by 2010. WLAs have been revised based on 10.0 MGD, but Certificate to Operate (CTO) for expansion must be secured by December 2010, or WLAs will decrease based on a design flow of 5.0 MGD. Hanover County also requested consideration for less stringent treatment requirements (8.0 mg/l TN rather than 4.0 mg/l; 1.0 mg/l TP rather than 0.3 mg/l) as the basis for their WLAs, and this comment is addressed in a section following on the James and York Water Quality Modeling Results.
- Rapidan S.A.-Gordonsville STP: Rapidan S.A. requested consideration for less stringent treatment requirements (8.0 mg/l TN rather than 4.0 mg/l; 1.0 mg/l TP rather than 0.3 mg/l) in the basis for

their WLAs, and this comment is addressed in a section following on the James and York Water Quality Modeling Results.

- Smurfit-Stone: 23.0 MGD design flow figure used as basis for WLAs approved by the Board on June 28, 2005. In the first public comment period on regulation amendments, owner provided process and instrumentation diagrams to support claim for 26.0 MGD design capacity, and has restated this claim in re-opened comment period. Owner-furnished figures used for treatment works (in gallons per minute) were the maximum ratings for unit processes, which is an unlikely operating status to be sustained under normal production conditions (“normal” operation capacity of units totaled 18.4 MGD). Therefore, the design flow basis for WLAs remains 23.0 MGD, based on the preceding and several other factors:

- The facility’s groundwater permit limits total withdrawal to 8.4 billion gallons/year (approximately 23.0 million gallons/day).
- Other discharge permit parameters (e.g., BOD5 limitations) are water quality based and more stringent than the applicable Federal Effluent Guidelines (that are production based). Thus, an increase in design flow would require a corresponding decrease in effluent concentrations to maintain regulatory loading caps for other pollutants, a capability the owner has not demonstrated in the materials provided.
- Facility is permitted as an industrial wastewater treatment plant; permit limitations and other technology-based WLAs are based on actual production rates and their associated flows. The existing bleach plant has a demonstrated capability to support 805 machine dried tons per day bleached Kraft pulp production (market plus paperboard). The permit was written to allow for this potential increase in production, and the facility has demonstrated that production rate without having an effluent discharge which exceeded the 22.21 MGD reported 30-day maximum flow.
- Use of 23.0 MGD as full production-based design flow is a significant percentage (about 89%) of the claimed maximum design flow (26.0 MGD), which is consistent with the approach used for other industrial dischargers.

Owner also requested consideration in the basis for their total phosphorus WLA for a less stringent treatment requirement (1.5 mg/l rather than 1.0 mg/l) to be consistent with the feasible treatment level at pulp/paper mills selected as equivalent to enhanced nutrient reduction at POTWs. This comment is addressed in a section following on the James and York Water Quality Modeling Results.

James

- Buena Vista STP – WLAs currently based 2.25 MGD; City requested increase based on 3.0 MGD. While permit reissued on 11/01/04 included a future design flow tier of 3.0 MGD, this does not determine the basis for WLA calculations, which is based on the design flow certified for operation by December 31, 2010. No major milestones timeline (e.g., permit modification, preliminary engineering report [PER], plans and specifications, bidding, construction) was provided. Design flow basis for WLAs remains unchanged, as no reasonable assurance has been documented that the expanded plant will be certified for operation by December 2010.
- Georgia Pacific – WLAs currently based on 8.0 MGD design flow; requested increase based on 10.87 MGD. Owner provided design basis for the wastewater treatment system, which was established based on the proper functioning of the activated sludge treatment system. The limiting design flow is 10.87 MGD, and is based on the 90% point of the peak overflow rate for the secondary clarifier. Since owner has not claimed capacity based on maximum ratings for unit processes, WLAs have been revised based on 10.87 MGD.
- South Central Wastewater Authority-Petersburg STP - WLAs currently based on 23.0 MGD; request increase based on 27.0 MGD. No major milestones timeline (e.g., permit modification, preliminary engineering report [PER], plans and specifications, bidding, construction) was provided. Design

flow basis for WLAs remains unchanged, as no reasonable assurance has been documented that the expanded plant will be certified for operation by December 2010.

- J.H. Miles, Inc. – WLAs currently set at TN = 158,826 lbs/yr; TP = 18,654 lbs/yr. Owner provided updated information on the evaluation of process changes and other cost-effective measures to reduce nutrient loads. A combination of holding discharge flow at current 0.35 MGD average (rather than using full design flow of 0.55 MGD), limiting production days (5 days/week average), substituting cleaning chemicals with less phosphate content, and reduction of marinate sent to waste treatment is projected to reduce the plant's annual TN and TP loads by 18 and 42 percent, respectively, over annual loads that could be discharged at full design flow and 7 days/week operation. Revised WLAs are TN = 153,500 lbs/yr; TP = 21,500 lbs/yr.
- Several facility owners (Chesterfield County, Town of Crewe, Hampton Roads Sanitation District, Hopewell Regional Wastewater Treatment Facility, City of Lexington, Lynchburg STP, Maury Service Authority, Rivanna Water and Sewer Authority) requested consideration for less stringent treatment requirements in the basis for WLAs at their plants, and this comment is addressed in a section following on the James and York Water Quality Modeling Results.

2. **Comment:** Reserve waste load allocations for two York Basin non-significant dischargers that have, or are planned to go off-line based on current permitted capacity and total nitrogen and total phosphorus concentrations reflecting secondary treatment levels (no additional nutrient removal treatment); provide explicit allocations for non-significant plants in regulation. (Spotsylvania Co. Utilities)

Response: *The WQMP regulation only deals with allocations for Significant Dischargers. Non-Significant Dischargers are dealt with through the rulemaking now underway for the Watershed General Permit (WGP; authorized by the 2005 Nutrient Credit Exchange Program statute). The agency will consider means through the WGP process to not discourage regionalization, but also to recognize the need to maintain loading caps.*

B. James and York River Water Quality Modeling Results – *comments pertaining to point source nutrient waste load allocations are covered in the following section. Comments on appropriate water quality standards will be addressed in the agenda item for York and James Special Standards.*

Comment: during the re-opened public review period (July-August) for the WQMP Regulation, several dischargers in the York and James basins requested increased nutrient waste load allocations that would result from less stringent treatment requirements (higher effluent nitrogen or phosphorus concentrations), rather than increased design flow figures, generally as follows: Do not adopt James and York waste load allocations until after approval of final water quality standards for these basins; consider less stringent requirements that can achieve same environmental objectives; review additional modeling results simulating less stringent treatment and resulting water quality standards compliance before finalizing nutrient allocations.

(Chesterfield County, Town of Crewe, Hampton Roads Sanitation District, Hopewell Regional Wastewater Treatment Facility, City of Lexington, Lynchburg STP, Maury Service Authority, Rivanna Water and Sewer Authority, VAMWA)

Response: *The response to these comments was deferred at the Board's September 21, 2005 meeting. A key reason for deferring staff recommendations on the James and York nutrient waste load allocations was to allow time for the EPA-Chesapeake Bay Program Office to run additional water quality modeling scenarios that had been negotiated with the Virginia Association of Municipal Wastewater Agencies. These scenario runs simulated varying nutrient reduction levels at the wastewater treatment plants in the York and James basins, with an assessment of the resulting water*

quality conditions in terms of compliance with dissolved oxygen standards in the York, and proposed numeric chlorophyll criteria in the James.

Two model scenarios were run, identified as “VATSJY1” and “VATSJY2” (VATS = Virginia Tributary Strategy; JY = James and York). Table 1 shows the nutrient removal levels for publicly owned treatment works (POTW) that were simulated, as follows:

Table 1. Annual average POTW point source total nitrogen (TN) and total phosphorus (TP) concentrations by basin and scenario.

Basin: Region	Scenario VATS JY1		Scenario VATS JY2	
	TN	TP	TN	TP
James River:				
Above Fall Line	6.0 mg/L	0.5 mg/L	6.0 mg/L	0.5 mg/L
Tidal Fresh	5.0 mg/L	0.5 mg/L	5.0 mg/L	0.5 mg/L
Lower Estuary	5.5 MPY	1.0 mg/L	6.9 MPY	1.0 mg/L
York River	6.0 mg/L	1.0 mg/L	8.0 mg/L	1.0 mg/L
Other basins	VATS or TS		VATS or TS	

Notes: NPS and sediments at VATS for James and York Rivers. James Lower Estuary nitrogen shown in million pounds per year (MPY).

After receiving the model results, DEQ staff drafted a set of management options that were shared and negotiated with POTW owners, industrial discharger representatives, citizen conservation organizations, and EPA. These management options also considered treatment levels that differed from those in the two scenarios above, with justification that included the expected water quality response, the reliability and cost-effectiveness of point source controls, consistency with policy decisions previously made in other Bay basins regarding use of stringent treatment, and achievement and maintenance of load caps committed to by the Chesapeake 2000 Agreement signatories.

In response to the October-November review period on the additional James and York water quality modeling runs, several commenters either endorsed a particular combination of treatment levels, or stated that the water quality conditions resulting from simulation of less stringent treatment requirements supported their requests for increased nutrient waste load allocations, as follows:

York Basin

- Chesapeake Bay Foundation – “...fully supports the recommendations in the Management Options... (POTWs at 6 mg/L TN and 0.7 mg/L TP; 2 paper mills at 1.0 mg/L TP)...”
- EPA Region 3 – “EPA supports the York River basin point source allocations as outlined in the Management Options ... allocations are supportive of Virginia’s adopted and proposed water quality standards ...allocations also ensure the entire burden of the required nutrient reductions does not fall on nonpoint sources...”
- Hampton Roads Sanitation District – “...recommends that the POTW point source allocations be established at the conditions evaluated in VATS JY2 (TN=8 mg/l, TP=1.0 mg/l at design flows).”
- Hanover County Utilities – “...nutrient allocations based on 6 to 8 mg/l and 1 mg/l of total nitrogen and total phosphorous respectively are appropriate based on the model results.”
- Virginia Association of Municipal Wastewater Agencies – “...allocations for York River dischargers should be based on at least 8 mg/l total nitrogen and 1 mg/l total phosphorus because all of the desired water quality benefits are attained at these levels.”

The agency response to these comments, as well as the other York discharger requests for less stringent treatment requirements submitted during the July-August re-opened review period, has been addressed through the management options described above. Following is the recommended option, with justification for the treatment levels selected.

1. York Basin Nitrogen Waste Load Allocations: Base POTW allocations on TN = 6.0 mg/l; retain industrial treatment levels, equivalent to enhanced nitrogen reduction at POTWs, as approved in June 2005. Justification for this selected option:

- Significant nutrient reduction needed to address existing poor water quality as evidenced by non-attainment of dissolved oxygen criteria in the lower river - ranging from 21% to 34% (from initial 2006 assessment results).
- Consistent with approach of using stringent technology to protect water quality.
- Total York point source discharged nitrogen load in 2000 was ~1.2 million pounds per year (MPY). An allocation based on TN = 8 mg/l only keeps point source loading at that level. A POTW allocation based on TN = 6 mg/l will reduce the load to 1.0 MPY.
- Increases likelihood of achieving water quality standards since nutrient reduction by point sources is more reliable than implementing nonpoint source controls.

2. York Basin Phosphorus Waste Load Allocations: Base POTW allocations on TP = 0.7 mg/l and two paper mill allocations (Bear Island Paper [co-discharge with Doswell STP] and Smurfit Stone) on 1.0 mg/l; retain other industrial treatment levels, equivalent to enhanced phosphorus reduction at POTWs, as approved in June 2005. Justification for this selected option:

- The estimated total York point source phosphorus load delivered to tidal waters in 2000 was ~0.164 MPY. An allocation based on TP = 1.0 mg/l for the POTWs and 1.5 mg/l for the two paper mills would be ~0.233 MPY delivered, a 42% increase over 2000 loads.
- An allocation based on POTWs at 0.7 mg/l and the paper mills at 1.0 mg/l is ~0.166 MPY delivered, which essentially holds-the-line. This would be acceptable since it appears phosphorus does not significantly influence water quality in the lower portion of the river.
- When this allocation is added to the total phosphorus loads in the other Virginia river basins, the total phosphorus tributary strategy loads are within 1% of the 6.0 MPY Virginia allocation.
- At a minimum, allocations should be set so the basin-wide point source loads do not increase from year 2000 levels.

James Basin

- Chesapeake Bay Foundation – “...fully supports the recommendations (as proposed in the DEQ staff correspondence referenced above)” [i.e., management options], “for... TN and TP allocations for POTWs above the fall line, TP allocations for POTWs in the Lower Estuary and phased reductions for TN allocations at POTWs in the Lower Estuary.”
- EPA Region 3 – “EPA supports the James River basin point source allocations for the above fall line, tidal fresh segment and ...total nitrogen allocations for the lower estuary facilities as outlined in the Management Options The allocations are supportive of Virginia’s proposed chlorophyll a water quality criteria for the tidal James River and its tidal tributaries.”
- Hampton Roads Sanitation District – “VATSJY2 loads are representative of anti-degradation levels.”... “There is no need to establish an allocation for the lower James River on the basis of BNR (i.e. 8 mg/l) as a minimum treatment level.”... “There is no present need to “phase in” a more stringent allocation than 6.9 MPY.”... “The attainment of existing interim State-wide nutrient allocation values is irrelevant.”
- Hopewell Regional Wastewater Treatment Facility - supports the results of the water quality modeling for the tidal fresh James River, which confirms the previously approved total nitrogen

WLA for HRWTF. Requests total phosphorus WLA increase based on 0.8 mg/l, rather than 0.5 mg/l, due to industrial nature of their wastewater and high cost to an already fiscally stressed municipality.

Response: Hopewell's phosphorus WLA approved in June 2005 was based on an annual average concentration of 0.3 mg/l and full design flow of 50.0 MGD. In a section which follows, it is now recommended that dischargers in the James tidal fresh region have their phosphorus WLAs based on a less stringent concentration of 0.5 mg/l, which provides some relief to Hopewell. In addition, more cost-effective alternatives to on-site treatment could become available through the nutrient credit exchange program now being developed.

- James River Association- "...urges the Board to exercise extreme caution in approving any increase to the waste load allocations based on the latest two model runs beyond the current approved allocations for the following reasons:" ... "...prudent and preferable to provide some margin of safety in the pollution allocations..." , (point source controls are) "most effective approach to achieve water quality standards..." , and "consistency with pollution allocations for other Virginia waters."
- Lynchburg Utilities – Review of model results demonstrate that WLAs approved at SWCB's 6/28/05 meeting were overly stringent and prove that higher point source WLAs will still achieve water quality standards. As a minimum, Lynchburg's total nitrogen and phosphorus WLAs approved in June are justified.
- Philip Morris USA – PMUSA's nitrogen WLA approved in June 2005 was based on the portion of the discharge deemed to be bioavailable to aquatic life. Concerns have been raised by EPA Region 3 staff regarding the study design used by PMUSA and their consultants, and the validity of the conclusion that a significant portion of the TN discharged (dissolved organic-nitrogen, which makes up nearly 88% of the TN) is not bioavailable. Discussions have been held among PMUSA and their consultants, EPA, and DEQ staff to identify the additional information needed to further justify the claim about bioavailability, and PMUSA will follow up in an attempt to address the concerns raised, so that the provision in Section 9VAC25-720-40 B. can be utilized to reduce the regulated portion of their discharge to the amount approved in June (18,547 lbs/yr). For now, the TN allocation has been revised to 139,724 lbs/yr, which includes the dissolved organic-nitrogen. It should be noted that even this WLA represents a significant reduction in the discharged TN load since PMUSA began modifying their wastewater process in 2001 to achieve near limit-of-treatment removal of ammonia and oxidized nitrogen, two forms that are bioavailable. From 1999 to 2000, PMUSA's average TN load was approximately 203,000 lbs/yr.
- Richmond Utilities - Review of model results demonstrate that WLAs approved at SWCB's 6/28/05 meeting were overly stringent and prove that higher point source WLAs will still achieve water quality standards. As a minimum, Richmond's total nitrogen and phosphorus WLAs approved in June are justified. "The management options...cut point source allocations more than the modeling results warrant. It is strongly recommended that if the DEQ believes in a market driven approach to achieve potential early reductions and continuous decrease in nutrients in the James River watershed, interpretation of modeling results should meet with the goal of incremental changes and equity between PS and NPS."
- South Central Wastewater Authority – encouraged by modeling results which indicate SCWA's total nitrogen and total phosphorus WLAs, based on management options (5 mg/l TN and 0.5 mg/l TP), at current and requested future design capacities of 23 MGD and 27 MGD, respectively, would meet the water quality standards.
- Virginia Association of Municipal Wastewater Agencies – concur with WLAs resulting from treatment levels simulated in recent model runs for above-fall-line (6.0 mg/l TN; 0.5 mg/l TP) and tidal fresh dischargers (5.0 mg/l TN; 0.5 mg/l TP). Set lower estuary total nitrogen WLA at 6.9 million pounds per year (6.7 MPY for HRSD plants), for the reasons detailed in HRSD's comment letter.

The agency response to these comments, as well as the other James discharger requests for less stringent treatment requirements submitted during the July-August re-opened review period, has been addressed through the management options described above. Following is the recommended option, with justification for the treatment levels selected.

1. Waste Load Allocations for James Above-Fall-Line and Tidal Fresh Regions: Base POTW allocations for above-fall-line region on TN = 6.0 mg/l and TP = 0.5 mg/l, and for the tidal fresh region on TN = 5.0 mg/l and TP = 0.5 mg/l. Justification for this selected option:

- Consistent with approach of using stringent technology to protect water quality.
- These allocations are predicted to achieve the proposed water quality chlorophyll summer criteria of 23 ug/l in the lower tidal fresh segment, and 22 ug/l in the oligohaline segment.

2. Waste Load Allocations for James Lower Estuary Region:

a. **Total Phosphorus** - Base POTW allocations in lower estuary on TP = 1 mg/l. Justification for this selected option:

- Higher salinity region is less responsive to changes in phosphorus levels.
- Minimum BNR nutrient removal level is acceptable.

b. **Total Nitrogen** – set total point source allocation in lower estuary at 6.15 million pounds per year (MPY), with 6.0 MPY allocated to HRSD facilities in aggregate. Justification for this selected option:

- Represents a significant reduction in TN load (~1.0 MPY) compared to current discharge levels.
- Contributes to restoration of SAV by improving water clarity and reducing algal growth on plant leaves.
- Model predictions show some benefits for chlorophyll levels at the segment level under long-term hydrology conditions. Local water quality on shorter time scales should also be improved.
- Nutrient Credit Exchange Program allows an owner of multiple plants in the same river basin to receive aggregated waste load allocations.

Regulatory Flexibility Analysis

Under recent amendments to the Administrative Process Act, agencies must include an analysis of alternative regulatory methods, consistent with health, safety, environmental, and economic welfare, that will accomplish the objectives of applicable law while minimizing the adverse impact on small business. Alternative regulatory methods include, at a minimum: 1) the establishment of less stringent compliance or reporting requirements; 2) the establishment of less stringent schedules or deadlines for compliance or reporting requirements; 3) the consolidation or simplification of compliance or reporting requirements; 4) the establishment of performance standards for small businesses to replace design or operational standards required in the proposed regulation; and 5) the exemption of small businesses from all or any part of the requirements contained in the proposed regulation.

The regulations for control of nutrient discharges from point sources in the Chesapeake Bay watershed are part of the Commonwealth's comprehensive initiative to restore water quality in Virginia's Bay waters. They will assist in achieving compliance with new tidal water quality standards that protect designated uses in the Bay and the tidal portions of its tributary rivers. Virginia has used a watershed-based approach in this restoration effort, combining nutrient and sediment reductions from both point sources and nonpoint sources. The point source component of the watershed-based approach assigns

total nitrogen and total phosphorus waste load allocations for significant nutrient dischargers, based on full design flow coupled with stringent nutrient reduction treatment. Alternative regulatory methods incorporated into this approach include:

- 1) *The establishment of less stringent compliance or reporting requirements:* *an allowance is made in Section 9 VAC 25-40-70.B.4, whereby the Board may establish a technology-based standard and associated concentration limitation less stringent than the applicable standard specified in preceding sections. This would be based on a demonstration by an owner or operator that the specified standard is not technically or economically feasible for the affected facility or that the technology-based standard and associated concentration limitation would require the owner or operator to construct treatment facilities not otherwise necessary to comply with his waste load allocation without reliance on nutrient credit exchanges pursuant to the 2005 Nutrient Credit Exchange Program law, provided, however, the discharger must achieve an annual total nitrogen waste load allocation and an annual total phosphorus waste load allocation as required by the Water Quality Management Planning Regulation (9 VAC 25-720).*

In addition, Section 9 VAC 25-40-70.C. specifies that the Board may approve an alternate compliance method to the technology-based effluent concentration limitations, by incorporating a provision into the VPDES permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility that allows suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system. The discharger would be required to operate the installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

- 2) *The establishment of less stringent schedules or deadlines for compliance or reporting requirements:* *The original proposals public-noticed for comment in February 2005 required significant dischargers to achieve compliance with the regulations within four years following reissuance or major modification of the VPDES permit, but in no case later than December 31, 2010. Non-significant dischargers were to have the discharge requirements placed in their reissued or modified VPDES permit after December 31, 2010, with compliance achieved within four years following that reissuance or major modification.*

The proposal adopted by the Board in June 2005 did not include these schedules for compliance. Instead, a compliance schedule will be developed by the Board under another rulemaking, which involves a regulation for a Watershed General Permit that will cover all the significant dischargers in the Bay drainage area. This regulation was authorized by the 2005 Nutrient Credit Exchange law, and is anticipated to be released for public comment in early 2006.

- 3) *The consolidation or simplification of compliance or reporting requirements:* *With the concurrence of the U.S. Environmental Protection Agency, the regulations for control of nutrient discharges from point sources in the Chesapeake Bay watershed are based on annual average concentration requirements (as opposed to weekly or monthly averages) and an annual reporting requirement for the discharged waste loads of total nitrogen and total phosphorus.*
- 4) *The establishment of performance standards for small businesses to replace design or operational standards required in the proposed regulation:* *In appropriate cases, industrial dischargers have been assigned waste load allocations that reflect “design flow” allowances for full production potential, proportional level-of-effort reduction compared to municipal plants, and unique wastewater qualities affecting ‘treatability’. Allowances may also be made, upon acceptable demonstration to the Board, that a significant portion of an industry’s discharged nutrient load is*

not 'bioavailable' to aquatic life, or that 'net' load limits should apply in order to address nutrients in intake water.

- 5) The exemption of small businesses from all or any part of the requirements contained in the proposed regulation: The regulations apply to significant dischargers of nutrients. There are thresholds of 'equivalent loads' that may exclude or exempt small businesses from the requirements, depending on the magnitude of their annual discharged total nitrogen and total phosphorus loads, as follows: "Equivalent load" means 2,300 pounds per year of total nitrogen and 300 pounds per year of total phosphorus at a flow volume of 40,000 gallons per day; 5,700 pounds per year of total nitrogen and 760 pounds per year of total phosphorus at a flow volume of 100,000 gallons per day; and 28,500 pounds per year of total nitrogen and 3,800 pounds per year of total phosphorus at a flow volume of 500,000 gallons per day."

Adoption of Amendments to Special Standards (9 VAC 25-260-310) for Numerical Water Quality Criteria for Chlorophyll *a* in the James River and Dissolved Oxygen in the Mattaponi and Pamunkey Rivers (also references in the River Basin Tables 9 VAC 25-260-410 and 530)

Executive Summary

Staff will recommend the Board re-adopt revised numerical chlorophyll *a* criteria for the James River. The revisions for several segments in the river including the spring mesohaline and polyhaline of 12 µg/l (from 10 µg/l), the summer oligohaline to 22 µg/l (from 15 µg/l) and summer lower tidal fresh of 23 µg/l (from 25 µg/l). These criteria were adjusted based on public comment and are deemed to be protective, attainable and reasonable. All other chlorophyll criteria remain the same as adopted by the Board. The Mattaponi and Pamunkey River site-specific dissolved oxygen concentrations also remain unchanged.

Background

Too much algae (measured as chlorophyll *a*) is an indicator of eutrophication which can cause water quality impairments. The James River has been listed as impaired for nutrients under the Clean Water Act § 303 and these criteria are necessary to protect designated uses in the river and to drive nutrient reductions in the basin. The five salinity segments from high salinity to low salinity (polyhaline, mesohaline, oligohaline, lower tidal fresh, upper tidal fresh) are illustrated in Figure 1.



Figure 1 James River Segments

At the June 28, 2005 quarterly meeting, the Board adopted amendments to the Water Quality Standards for numerical water quality criteria for chlorophyll *a* in the tidal James River and dissolved

oxygen in the tidal Mattaponi and Pamunkey Rivers. However, the effective date of the amendments was suspended in order to provide the public opportunity to comment on the changes made to the summer lower tidal fresh criterion (revised from 20 µg/l to 25 µg/l based on attainability concerns) and the James River Alternatives Analysis. The purpose of this alternatives analysis was to consider the benefits, detriments and costs of a range of nutrient loading scenarios and the corresponding predicted chlorophyll *a* levels. The analysis showed the chlorophyll criteria can be met under the nutrient loadings in the Water Quality Management Planning Regulation (also adopted with suspension on June 28). This comment period ran from July 25 to August 24, 2005.

At the June Board meeting, staff also agreed to conduct additional James and York River alternative model scenarios as requested by the Virginia Association of Municipal Wastewater Agency (VAMWA). Final agreement was reached to conduct two more model scenarios in both the James and York Rivers for VAMWA. These requested model scenarios were to investigate chlorophyll responses in the lower estuary of the James River and phosphorus limitation in the York River. Results of these two additional model scenarios (identified as VATSJY1 and VATSJY2) and the Water Quality Management Planning Regulation scenario (identified as VATSJR Alternate) are complete and have been shared with the stakeholders. The results of VATSJY1 and VATSJY2 were completed outside of the published 30-day comment period and an additional comment period was provided from October 18 to November 1, 2005 to review all the model results. With these last three scenarios, we have waste load allocations and the resulting chlorophyll concentrations for 17 different model scenarios. Recall, that at the request of VAMWA and Senator Williams with DEQ and EPA input, fourteen scenarios had previously been run which led to the recommended revised summer tidal fresh criterion of 25 µg/l that was adopted by the Board (with suspension) in June. All the scenarios and the results are included in the attachment entitled James River Alternatives Analysis Addendum #4.

The alternatives analysis showed that acceptable chlorophyll *a* concentrations and other environmental benefits could be achieved in many segments of the James under various nutrient loading scenarios.

Summary Of Public Comment And Response

Comments and responses are included from the suspended comment period which ran from July 25 through August 24, 2005 and a special two week comment period that ran October 18 through November 1, 2005 which was published in response to the results of the VAMWA requested model scenarios (VATSJY1 and VATSJY2).

Overall, the environmental groups are generally in favor of the lower chlorophyll criteria as originally proposed. The agency received almost 400 letters (most were form letters sent via email) from private citizens in support of the criteria and to proceed without further delay. During the second comment period, the Chesapeake Bay Foundation and the James River Association stated that small adjustments to the criteria are supported by the most recent computer model results and are readily attainable with the proposed nutrient pollution reductions from combined point and nonpoint sources.

The regulated community is still opposed to the technical basis of the criteria; although they believe the 25 µg/l in the summer lower tidal fresh represents the best technical case for chlorophyll targets because there is more confidence in the direct linkage between chlorophyll and actual use impairment. They do not believe this value should be adjusted downward because 25µg/l is a protective value and there is uncertainty with the model. Setting the criterion at a lower value would be setting the goal at the brink of non-attainment.

The regulated community does not agree with the technical basis for the chlorophyll criteria in the meso and polyhaline segments and recommend the Board should use anti-degradation policies and non-regulatory approaches to manage nutrient loads in these segments where the impairment linkage is

not as direct. The criteria in these segments should reflect the natural spring bloom phenomenon and be set at 15 µg/l. They do not believe this value should be adjusted downward for the same reasons stated above.

The regulated community believes the summer oligohaline criteria cannot be attained and recommends the Board adjust the value to 25µg/l so that it is fully attainable.

EPA supports the criteria being recommended by staff and stated specifically that they support the adjustments of the summer tidal fresh and the spring meso and polyhaline criteria. They believe the adjusted values will protect against the adverse effects of harmful algal blooms, provide for a healthier aquatic food web and lead to a more balanced, indigenous population of algae. These adjusted criteria have been documented as attainable when the nitrogen and phosphorus cap load allocations currently being considered by Virginia for the James River basin are fully achieved. EPA encourages Virginia to consider new scientific findings and enhanced information on attainability in future triennial reviews of the water quality standards regulation.

DEQ agrees the criteria should be adopted without unnecessary delay. The agency also believes the criteria adjustments are still protective and will lead to the needed nutrient reductions in the James River. DEQ acknowledges that the current state of the science for deriving numerical chlorophyll a criteria to protect these designated uses is not as quantitatively precise as that supporting other published criteria in terms of the exact concentrations at which adverse impairments to aquatic life are certain to occur. We believe that attainability can be factored into the final criteria to help us focus in on a chlorophyll concentration that is protective of aquatic life uses in these segments and is also reasonable. There are four segments that VAMWA has concerns about in their comments and DEQ agrees these criteria could be adjusted based on attainability and will remain protective of designated uses based on the available scientific findings. The results of the James River alternatives analysis suggest that the following concentration adjustments meet those requirements: from 10 µg/l to 12 µg/l in the spring mesohaline and polyhaline, from 15 µg/l to 22 µg/l in the summer oligohaline and from 25 µg/l to 23 µg/l in the summer lower tidal fresh. Note that the adjustment of the oligohaline value, while a larger adjustment than seen in the other segments, also better reflects the type of algal community present in the lower salinity waters which is similar to the lower tidal fresh. Staff believes aquatic life use in this segment will be protected at a chlorophyll criteria value that is similar to the lower tidal fresh value. We do not agree to adjust the values higher based on model uncertainties as VAMWA suggested as we must also respond to comments from the environmental groups who believe that the adjustment of the values should be minimal beyond what was originally proposed. We also believe the VAMWA concerns will be addressed as biological reference curves are developed in the future for use in assessing attainment of these chlorophyll criteria.

Conclusion

Staff will recommend the Board re-adopt a revised chlorophyll criterion for the James River spring mesohaline and polyhaline of 12 µg/l, summer oligohaline of 22 µg/l and a summer lower tidal fresh of 23 µg/l. All other criteria remain the same as adopted by the Board in June 2005. The rationale is as follows and is based on public comment:

- There is a clear need to set numerical criteria in the tidal James River;
- Setting chlorophyll criteria is not as quantitatively precise as the dissolved oxygen or water quality recommendations;
- Attainability can be used to focus in on a criterion value that will remain protective of designated uses based on the available scientific findings;

- The recent model results demonstrate that a higher criterion of 12 µg/l (adjusted from 10 µg/l) in the spring meso and polyhaline segments is attainable and protective under the treatment levels evaluated;
- The recent model results demonstrate that a higher criterion of 22 µg/l (adjusted from 15 µg/l) in the summer oligohaline segment is attainable and protective under the treatment levels evaluated;
- The recent model results demonstrate that a slightly lower criterion of 23 ug/l (adjusted from 25 µg/l) in the tidal fresh segment is attainable and protective under the treatment levels evaluated.

Amendments

The James River chlorophyll amendments (9 VAC 25-260-310 paragraph bb) are summarized in the following table:

Designated Use	Chlorophyll <i>a</i> µg/l	Chesapeake Bay Program Segment	Temporal Application
Open-Water	10	JMSTF2	March 1 - May 31
	15	JMSTF1	
	15	JMSOH	
	[40-12]	JMSMH	
	[40-12]	JMSPH	
	15	JMSTF2	July 1 - September 30
	20 [25 23]	JMSTF1	
	[45 22]	JMSOH	
	10	JMSMH	
	10	JMSPH	

Note that the amendments include the site-specific dissolved oxygen criteria for the Mattaponi and Pamunkey Rivers in the York basin (9 VAC 25-260-310 paragraph aa) and the associated references to both basin special standards (James and York) in the River Basin Section Tables (9 VAC 25-260-410 and 530). The Mattaponi and Pamunkey amendments are summarized below and are the same values previously adopted at the June meeting:

Designated use	Criteria Concentration/ Duration	Temporal Application
Open-Water	30 day mean \geq 4.0 mg/l	June 1 - September 30
	Instantaneous minimum \geq 3.2 mg/l at temperatures $<29^{\circ}\text{C}$	
	Instantaneous minimum \geq 4.3 mg/l at temperatures $\geq 29^{\circ}\text{C}$	

Regulatory Flexibility Analysis

Under recent amendments to the Administrative Process Act, agencies must include an analysis of alternative regulatory methods, consistent with health, safety, environmental, and economic welfare, that will accomplish the objectives of applicable law while minimizing the adverse impact on small business. Many alternatives were considered as part of the development of these water quality standards. The agency conducted an alternative analysis to consider the benefits, detriments and costs of a range of nutrient loading scenarios and the corresponding predicted chlorophyll *a* levels. The alternatives analysis showed that acceptable chlorophyll *a* concentrations and other environmental benefits could be achieved in many segments of the James under various nutrient loading scenarios. As a result of this analysis and public comment, staff adjusted several of the criteria so that they are attainable, reasonable and protective of designated uses.

The water quality standards considered in this rulemaking are part of the Commonwealth's comprehensive initiative to restore water quality in Virginia's Bay waters and protect designated uses in the Bay and the tidal portions of its tributary rivers. These standards will be implemented through waste load allocation requirements present in the Water Quality Management Planning Regulation (9 VAC 25-720) and the Regulation for Nutrient Enriched Waters (9 VAC 25-40). The Administrative Process Act specifies that alternative regulatory methods include, at a minimum: 1) the establishment of less stringent compliance or reporting requirements; 2) the establishment of less stringent schedules or deadlines for compliance or reporting requirements; 3) the consolidation or simplification of compliance or reporting requirements; 4) the establishment of performance standards for small businesses to replace design or operational standards required in the proposed regulation; and 5) the

exemption of small businesses from all or any part of the requirements contained in the proposed regulation. These specific alternative methods have been included as part of those implementation regulations (Water Quality Management Planning Regulation (9 VAC 25-720) and the Regulation for Nutrient Enriched Waters (9 VAC 25-40)).

General regulatory flexibility is included in the water quality standards regulation under 9 VAC 25-260-140.E (Variances to Water Quality Standards). Variances to numeric criteria may be granted under the following conditions:

1. Naturally occurring pollutant concentrations prevent the attainment of the use;
2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating state water conservation requirements to enable uses to be met;
3. Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;
4. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use;
5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
6. Controls more stringent than those required by §§ 301(b) and 306 of the Clean Water Act would result in substantial and widespread economic and social impact.

Variances shall not prevent the maintenance and protection of existing uses or exempt the discharger or regulated activity from compliance with other appropriate technology or water quality-based limits or best management practices.

It should be noted that the no small businesses are expressly exempted from the water quality standard regulations. However, the implementing regulations that accompany these water quality standards for the Chesapeake Bay and tidal tributaries apply to significant dischargers of nutrients (Water Quality Management Planning Regulation (9 VAC 25-720) and the Regulation for Nutrient Enriched Waters (9 VAC 25-40)). There are thresholds of 'equivalent loads' that may exclude or exempt small businesses from the requirements, depending on the magnitude of their annual discharged total nitrogen and total phosphorus loads specified in those implementing regulations.